

Butyrophilin has been identified in bovine, murine and human (see Taylor et al., Biochim. Biophys. Acta 1306:1-4 (1996), Ishii et al., Biochim. Biophys. Acta 1245:285-292 (1995), Mather et al., J. Dairy Sci. 76:3832-3850 (1993) and Banghart et al., J. Biol. Chem. 273:4171-4179 (1998)) and is a type I transmembrane protein that is incorporated into the fat globulin membrane. It has been suggested that butyrophilin may play a role as the principle scaffold for the assembly of a complex with xanthine dehydrogenase/oxidase and other proteins that function in the budding and release of milk-fat globules from the apical surface during lactation (Banghart et al., supra).

Given that butyrophilin plays an obviously important role in mammalian milk production, there is substantial interest in identifying novel butyrophilin homologs. We herein describe the identification and characterization of a novel polypeptide having homology to butyrophilin, designated herein as PRO352.

## 22. PRO381

The immunophilins are a family of proteins that function as receptors for immunosuppressant drugs, such as cyclosporin A, FK506, and rapamycin. The immunophilins occur in two separate classes, (1) the FK506-binding proteins (FKBPs), which bind to FK506 and rapamycin, and (2) the cyclophilins, which bind to cyclosporin A. With regard to the FK506-binding proteins, it has been reported that the FK506/FKBP complex functions to inhibit the activity of the serine/threonine protein phosphatase 2B (calcineurin), thereby providing immunosuppressant activity (Gold, Mol. Neurobiol. 15:285-306 (1997)). It has also been reported that the FKBP immunophilins are found in the mammalian nervous system and may be involved in axonal regeneration in the central nervous system through a mechanism that is independent of the process by which immunosuppression is achieved (Gold, supra). Thus, there is substantial interest in identifying novel polypeptides having homology to the FKBP immunophilins. We herein describe the identification and characterization of a novel polypeptide having homology to an FKBP immunophilin protein, designated herein as PRO381.

## 23. PRO386

Mammalian cell membranes perform very important functions relating to the structural integrity and activity of various cells and tissues. Of particular interest in membrane physiology is the study of transmembrane ion channels which act to directly control a variety of physiological, pharmacological and cellular processes. Numerous ion channels have been identified including calcium (Ca), sodium (Na) and potassium (K) channels, each of which have been analyzed in detail to determine their roles in physiological processes in vertebrate and insect cells.

One type of cell membrane-associated ion channel, the sodium channel, plays an extremely important role in a cell's ability to maintain ionic homeostasis as well as transmit intracellular and extracellular signals. Voltage-gated sodium channels in brain neurons have been shown to be complexes of a pore-forming alpha unit with smaller beta-1 and beta-2 subunits (Isom et al., Cell 83:433-442 (1995)). Given the obvious importance of sodium channels in cellular homeostasis and other important physiological functions, there is a significant

interest in identifying novel polypeptides having homology to sodium channel subunits. We herein describe the identification and characterization of a novel polypeptide having homology to the beta-2 subunit of the rat sodium channel, designated herein as PRO386.

24. **PRO540**

Lecithin-cholesterol acyltransferase ("LCAT"), also known as phosphatidylcholine-sterol acyltransferase is a key enzyme in the intravascular metabolism of high density lipoproteins, specifically in the process of cholesterol metabolism. [see, for example, Brousseau et al., J. Lipid Res., 38(12):2537-2547 (1997), Hill et al., Biochem. J., 294:879-884 (1993), and Drayna et al., Nature 327 (6123):632-634 (1987)]. Given the medical importance of lipid metabolism, efforts are currently being under taken to identify new, native proteins which are involved in lipid transport. We describe herein the identification of a novel polypeptide which has homology to LCAT, designated herein as PRO540.

25. **PRO615**

Synaptogyrin is a synaptic vesicle protein that is uniformly distributed in the nervous system. The cDNA encoding synaptogyrin has been cloned and sequenced and the sequence predicts a protein with a molecular mass of 25,900 D with four membrane-spanning domains. Synaptogyrin has been implicated in membrane traffic to and from the plasma membrane. Stenius et al., J. Cell. Biol. 131(6-2):1801-1809 (1995). In addition, a novel isoform of synaptogyrin called cellugyrin exhibits sequence identity with synaptogyrin. In rat tissues, cellugyrin and synaptogyrins are expressed in mirror image patterns. Cellugyrin is ubiquitously present in all tissues tested with the lowest levels in brain tissue, whereas synaptogyrin protein is only detectable in brain. In rat tissues, cellugyrin and synaptogyrins are expressed in mirror image patterns. The synaptic vesicle protein synaptogyrin may be a specialized version of a ubiquitous protein, cellugyrin, with the two proteins sharing structural similarity but differing in localization. This finding supports the emerging concept of synaptic vesicles as the simplified and specialized form of a generic trafficking organelle. [Janz et al., J. Biol. Chem. 273(5):2851-2857 (1998)]. The sequence for cellugyrin derived from the Norway rat, *Rattus norvegicus* has been deposited in the Genbank database on 23 December 1997, designated accession number AF039085. See also, Janz et al., J. Biol. Chem. 273 (1998), in press.

Given the medical importance of synaptic transmission, efforts are currently being under taken to identify new, native proteins that may be part of a simplified and specialized generic trafficking organelle in the form of synaptic vesicles. We describe herein the identification of a novel polypeptide which has homology to synaptogyrin, designated herein as PRO615.

26. **PRO618**

Enteropeptidase is a key enzyme in the intestinal digestion cascade specifically cleaves the acidic propeptide from trypsinogen to yield active trypsin. This cleavage initiates a cascade of proteolytic reactions leading to the activation of many pancreatic zymogens.

See, for example, Matsushima et al., J. Biol. Chem. 269(31):19976-19982 (1994), Kitamoto et al., Proc. Nat. Acad. Sci., 91(16):7588-7592 (1994). Enterokinase (enteropeptidase) is a related to mammalian serine proteases

involved in digestion, coagulation, and fibrinolysis. LaVallie et al., J Biol Chem., 268(31):23311-23317 (1993).

Given the medical importance of digestive processes, efforts are currently being under taken to identify new, native proteins that may be involved in digestion, coagulation, and fibrinolysis. We describe herein the identification of a novel polypeptide which has homology to enteropeptidase, designated herein as PRO618.

5 27. PRO719

Lipoprotein lipase is a key enzyme that mediates the hydrolysis of triglycerides and phospholipids present in circulating plasma lipoproteins (Dugi et al., J. Biol. Chem., 270:25396-25401 (1995)). Moreover, lipoprotein lipase has been shown to mediate the uptake of lipoproteins into cells, wherein cellular uptake of lipoproteins is initiated by binding of lipoprotein lipase to cell surface proteoglycans and to the low density lipoprotein (LDL) receptor-related protein (Krapp et al., J. Lipid Res., 36:2362-2373 (1995)). Thus, it is clear that lipoprotein lipase plays an extremely important role in lipoprotein and cholesterol metabolism. There is, therefore, substantial interest in identifying novel polypeptides that share sequence homology and/or biological activity with lipoprotein lipase. We herein describe the identification and characterization of a novel polypeptide having sequence homology to lipoprotein lipase H, designated herein as PRO719.

15 28. PRO724

The low density lipoprotein (LDL) receptor is a membrane-bound protein that plays a key role in cholesterol homeostasis, mediating cellular uptake of lipoprotein particles by high affinity binding to its ligands, apolipoprotein (apo) B-100 and apoE. The ligand-binding domain of the LDL receptor contains 7 cysteine-rich repeats of approximately 40 amino acids, wherein each repeat contains 6 cysteines, which form 3 intra-repeat disulfide bonds. These unique structural features provide the LDL receptor with its ability to specifically interact with apo B-100 and apoE, thereby allowing for transport of these lipoprotein particles across cellular membranes and metabolism of their components. Soluble fragments containing the extracellular domain of the LDL receptor have been shown to retain the ability to interact with its specific lipoprotein ligands (Simmons et al., J. Biol. Chem., 272:25531-25536 (1997)). Thus, it is clear that the LDL receptor is intimately involved in important physiological activities related to cholesterol metabolism. As such, there is substantial interest in identifying novel LDL receptor homolog proteins. We herein describe the identification and characterization of a novel polypeptide having homology to the human LDL receptor protein, designated herein as PRO724..

25 30 29. PRO772

Expression of the human gene A4 is enriched in the colonic epithelium and is transcriptionally activated on differentiation of colonic epithelial cells in vitro (Oliva et al., Arch. Biochem. Biophys., 302:183-192 (1993) and Oliva et al., Am. J. Physiol., 272:C957-C965 (1997)). A4 cDNA contains an open reading frame that predicts a polypeptide of approximately 17 kilodaltons in size. Hydrophathy analysis of the A4 protein revealed four putative membrane-spanning alpha-helices. Immunocytochemical studies of cells expressing A4 protein indicated that expression is localized to the endoplasmic reticulum. The four membrane-spanning domains and the biophysical characteristics of the A4 protein suggest that it belongs to a family of integral membrane proteins called proteolipids, some of which multimerize to form ion channels. In fact, preliminary evidence has suggested